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C-O-N-F-I-D-E-N-T-I-A-L

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COUNTRY Hungary

REPORT

SUBJECT Hungarian Surveying Instruments :

DATE DISTR.

(Description of; Sketches)

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SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

COPY

1. report on Hungarian
surveying instruments.

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ARMY review completed.

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Attachment

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HUNGARIAN SURVEYING INSTRUMENTS

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Summary : This report contains information on six Hungarian-manufactured surveying instruments.

the sixth was an export version of one of the other instruments. Covered in this report are four levels, one tachymeter and one theodolite, all of which were allegedly original design products of the Hungarian optical industry. Included as Annexes are three sketches of two of the levels and the tachymeter described in this report, plus a sketch of the reticle design used in these instruments.

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Introduction

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topographic instruments described in this report [redacted] were allegedly all original products of the Gamma Optical Works (Gamma) or the Hungarian Optical Works (Magyar Optikai Művek - MOM) in BUDAPEST. [redacted]

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A. GAMMA LEVEL (See Annex "A" [redacted] sketch of "Gamma" Level).

1. General Description

a. Nomenclature: Gamma leveling instruments (Gamma szintezőműszer) was the only name by which [redacted] engineers) knew this instrument.

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b. Manufacturer: Gamma Optical Works, BUDAPEST.

c. Year of Manufacture: Originally produced in 1951.

d. [redacted] "Gamma, Budapest" and an instrument [redacted]

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e. Dimensions: 12 cm high and 27 cm long.

f. Weight: Approximately 2 kg.

g. Type: Dumpy.

h. Primary Use: Leveling surveys.

2. Telescope

a. Magnification: 10 x.

b. Diameter of Objective Lens: 35 mm.

c. Reticle Design: Centered horizontal and vertical crosshairs with short horizontal marks dividing the vertical field into equal quarters (See Annex B [redacted] sketch of reticle design).

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3. Leveling System

a. Type, Location and Housing of Bubble Levels: Adjustable tubular spirit bubble level in an enclosed housing along the left side of the telescope. There was also a bulls-eye level located in one corner of the base plate.

b. Number of Leveling Screws: Three.

4. Facilities for Viewing Bubble Levels

Prisms provided a coincidence view of the bubble within the telescope ocular. Available light illumination was provided by a metal reflector, which was mounted on the open bottom of the reflector housing.

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5. Miscellaneous Information

This level cost 3,000 (Hungarian) forint.

6. Facilities for Attaching Instrument to Base of Tripod

Radiating from the bolt hole in the tripod base were three equally-spaced shallow grooves into which the leveling screws fitted and which helped to align the tripod and instrument bolt holes. This level, as well as all other instruments described in this report, was used with the Model 116F Tripod

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B. SMALL "MOM" LEVEL (See Annex "C" sketch of Small MOM level).

1. General Description

- a. Nomenclature: Small MOM Leveling Instrument (Kis MOM szintezőműszer).
- b. Manufacture: Hungarian Optical Works, BUDAPEST.
- c. Year of Manufacture: Originally produced in 1950 or 1951.
- d. "MOM, Budapest", and the instrument's

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e. Dimensions: 10 cm high x 16 cm long.

f. Weight: 1.5 kg.

g. Type: Dumpy.

h. Primary Use: For leveling surveys.

i. Maximum Distance for Accuracy: 50 m.

2. Telescope

- a. Magnification: 10 x.
- b. Diameter of Objective Lens: 30 mm.
- c. Reticle Design: See section A, paragraph 2c, above.
- d. Shortest Focusing Distance: 6 m.

3. Circles

- a. Diameter: 11 cm (vertical circle).
- b. Material Composition: Silver-galvanized copper.
- c. Graduations in Degrees: 360°
- d. Direct Reading (graduation interval): 1° (on upper scale).
- e. Least Direct Reading: 2' (with glass magnifier).
- f. Number of Tangent Screws and Clamps: One

g. Describe Facilities to Set Horizontal Circle on a Specific Graduation: Approximate setting made with horizontal clamp; fine adjustment with horizontal tangent screw.

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4. Leveling System

a. Type, Location and Housing of Bubble Levels: Same as section A, paragraph 3a, above.

b. Number of Leveling Screws: Three.

5. Facilities for Viewing Bubble Levels

Same as section A, paragraph 4, above, except for the reflector, which was of a flexible synthetic material.

C. DE LUXE SMALL MOM LEVEL

[redacted] this was an export version of the level described in paragraph B, above.

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[redacted] The export version, which was called the Model 35U was equipped with magnifying lenses for reading the bubble level and the horizontal circle, and was generally identical with the domestic version (See section B, paragraph 1, above).

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[redacted] This export level cost 2,000 forint.

D. "SZEPESSY" TACHYMETER (See Annex D for [redacted] sketch of Szepessy Tachymeter.)

1. General Description

a. Nomenclature: Szepessy Tachymeter, (Szepessy Tachymeter):

b. Manufacture: Gamma Optical Works, BUDAPEST.

c. Year of Manufacture: Originally produced in 1950.

d. [redacted] "Szepessy Tachymeter, Gamma, Budapest"

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e. Dimensions: 15 cm wide x 30 cm high (with scope vertical).

f. Weight: 5 kg.

g. Primary Use: Topographic surveys.

2. Telescope

a. Magnification: 20 x.

b. Diameter of Objective Lens: 30 mm.

c. Reticule Design: Same as section A, paragraph 2c above.

d. Mirror, Prism and Filter Attachments: Reflector mirror for reading vertical tangents.

e. Shortest Focusing Distances: 5 or 6 m.

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3. Circle

- a. Diameter: 11 cm.
- b. Material Composition: Silver-galvanized copper.
- c. Graduations in Degrees: 360°.
- d. Direct Reading: 20'.
- e. Least Direct Reading (with vernier): 10".
- f. Number of Tangent Screws and Clamps: One tangent screw.
- g. Facilities to Set Horizontal Circle on a Specific Graduation:

Micrometer.

4. Leveling System

a. Type, Location and Housing of Bubble Levels: Four spirit bubble levels. One is mounted on telescope, parallel to the line of sight; a second and smaller level is mounted on one of the telescope supports and is employed in vertical positioning; the remaining two levels are mounted on the horizontal circle housing and are positioned at right angles to each other.

- b. Number of Leveling Screws: Three.

5. Facilities for Viewing Bubble Levels

All levels viewed directly.

6. Facilities for Centering Instrument Over Station

Plumb bob.

E. LARGE "MOM" LEVEL

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[] this model [] the least accurate of the several models of engineer's levels used by UVATERV.

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1. General Description

a. Nomenclature: The Hungarian [] Leveling Instrument (Nagy MOM Szintezőműszer).

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- b. Model: 35 F.
- c. Manufacturer: Hungarian Optical Works, BUDAPEST.
- d. Year of Manufacture: Originally produced in 1950.
- e. [] BUDAPEST, and the instrument's []

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- f. Weight: Approximately 2 kg.
- g. Type: Dumpy.
- h. Primary Use: For leveling surveys.
- i. Maximum Distance for Accuracy: 100 m.

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2. Telescope

- a. Magnification: 25 x.
- b. Diameter of Objective Lens: 35 mm.
- c. Reticle Design: Same as section A, paragraph 2c, above.
- d. Shortest Focusing Distance: 4 or 5 m.

3. Leveling System (Same as for the Small "MOM" level, see section A, paragraph 4a, above, except for the following features:)

- a. The bubble level was viewed through a magnifying glass mounted on top of the bubble level housing.
- b. This instrument had only one bubble level adjusting screw, as opposed to four on the Small "MOM" level.

4. Remarks:

This instrument cost 3,000 forint.

F. "MOM" 40 THEODOLITE

1. General Description

- a. Nomenclature: The Hungarian identification was "MOM" 40 Theodolite.
- b. Model: 40.
- c. Manufacturer: Hungarian Optical Works, BUDAPEST.
- d. Year of Manufacture: Originally produced in 1950.
- e. Weight: 8 or 9 kg.
- f. Primary Use: Triangular, multi-angle, straight line and traverse surveys.

2. Telescope

- a. Magnification: 25 x.
- b. Diameter of Objective Lens: 30 mm.
- c. Reticle Design: Same as section A, paragraph 2c, above.
- d. Shortest Focusing Distance: 8 or 10 m.

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3. Circle

- a. Diameter (vertical circle): 13 cm.
- b. Material Composition: Silver-galvanized copper.
- c. Graduations in Degrees: 360°.
- d. Direct Reading: 10'.
- e. Least Direct Reading: 6".
- f. Number of Tangent Screws: Two.

4. Leveling System

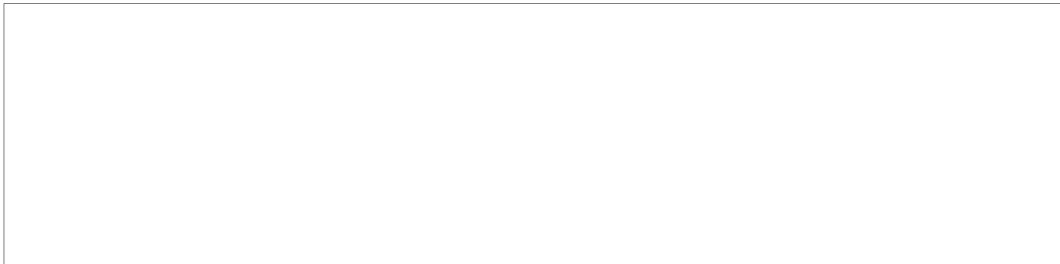
- a. Type, Location and Housing of Bubble Levels: Two on upper swivel.
- b. Number of Leveling Screws: Three.
- c. Facilities for Viewing Bubble Level: None; direct viewing.

5. Facilities for Centering Instrument Over Station

- a. Plumb bob.

6. Remarks

This theodolite cost 9 to 10,000 forint.



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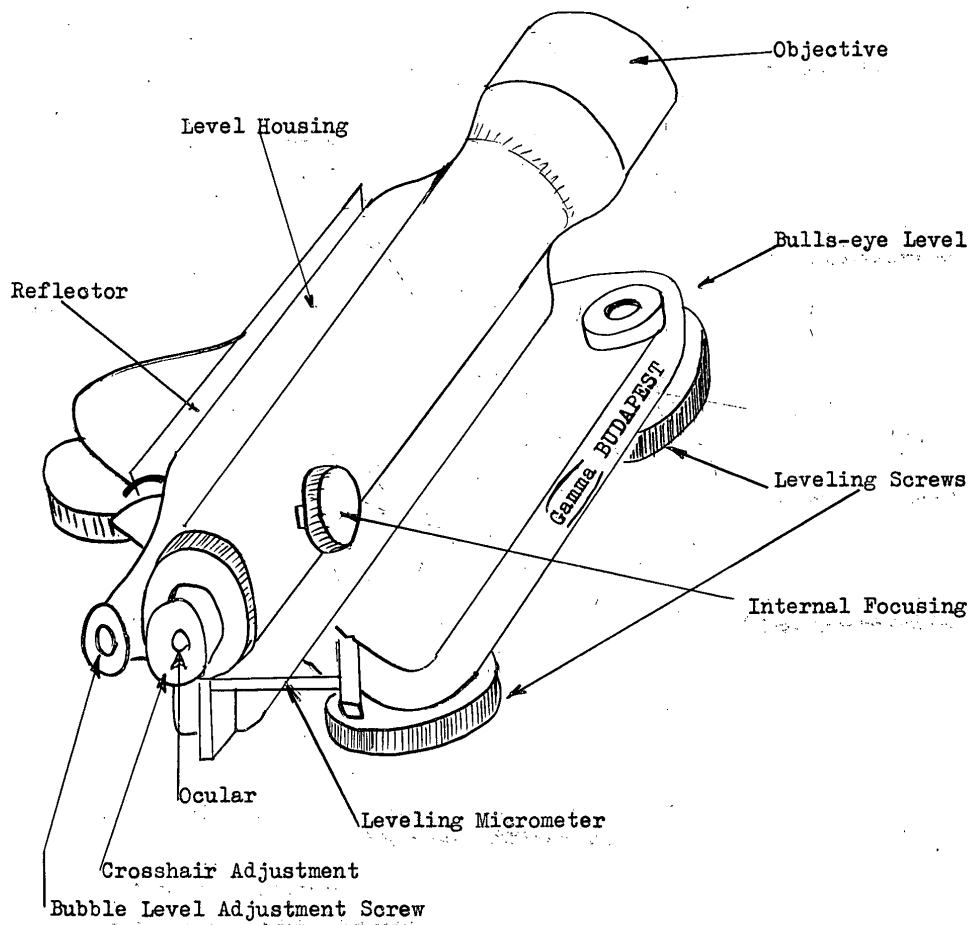
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Annex A

SKETCH OF THE "GAMMA" LEVEL

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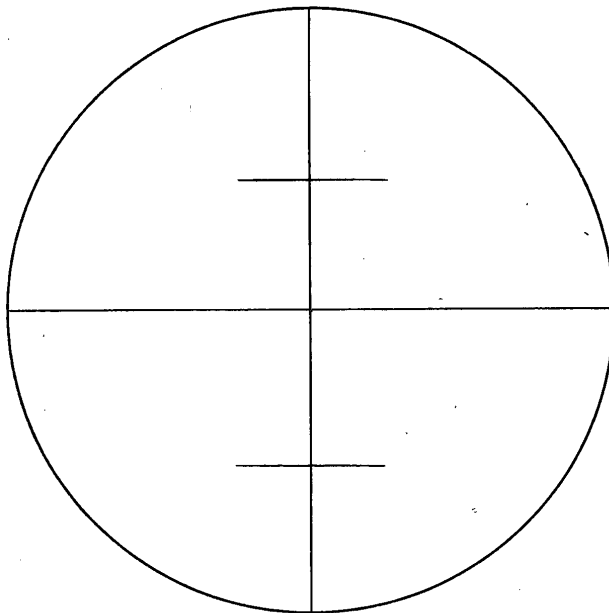
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Annex B



SKETCH OF RETICLE DESIGN OF HUNGARIAN
SURVEYING INSTRUMENTS

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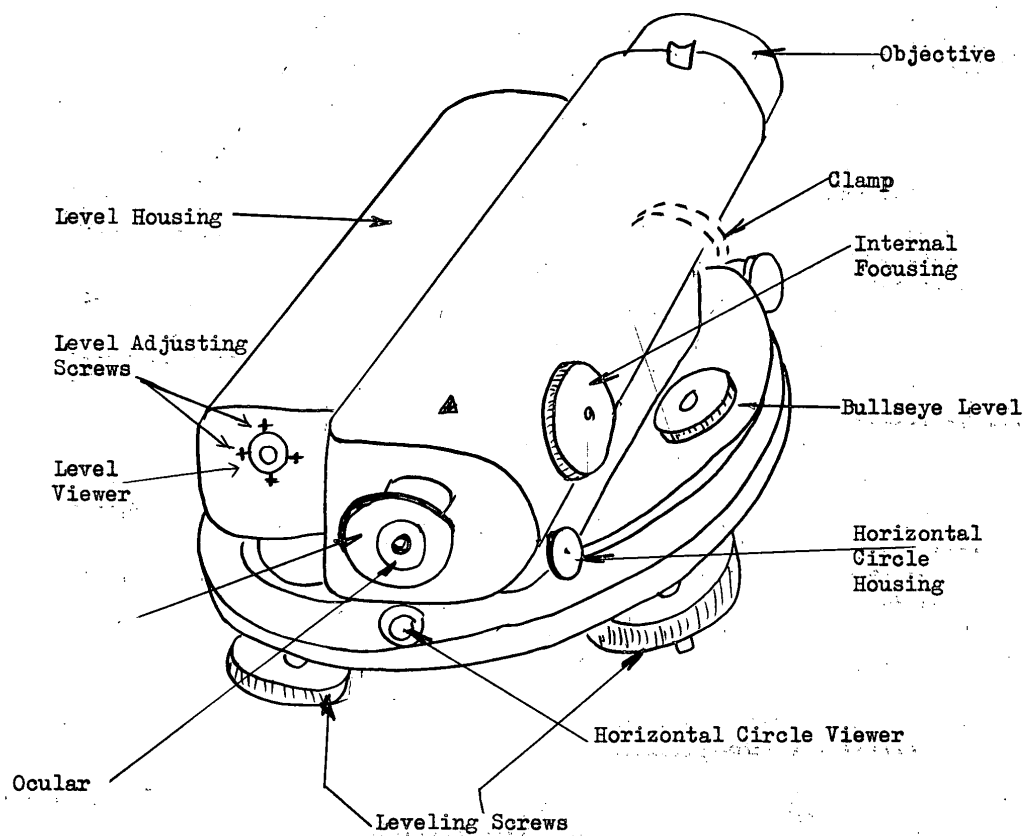
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Annex C

SKETCH OF SMALL "MOM" LEVEL

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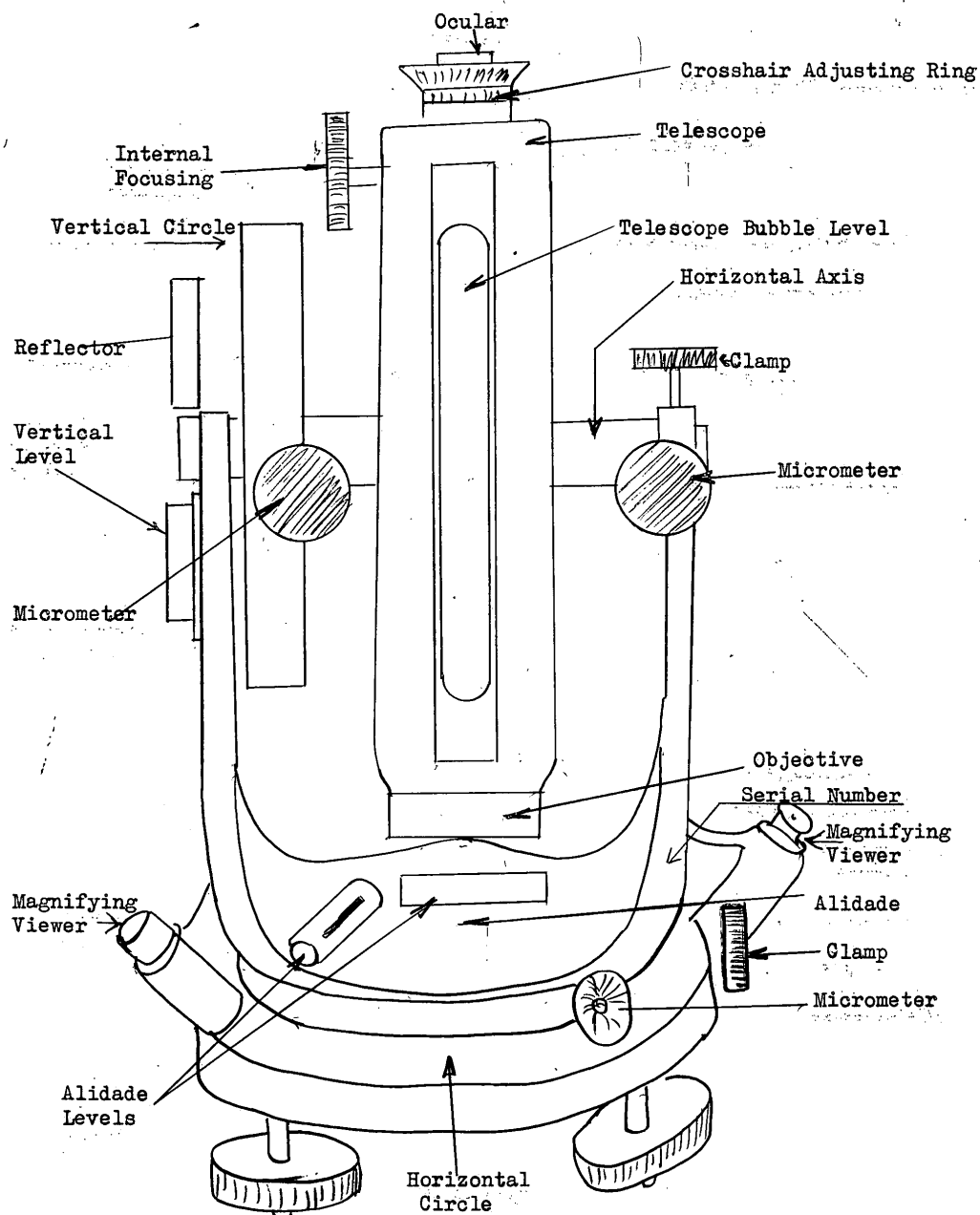
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Annex D

SKETCH OF THE "SZEPESY" TACHYMETER

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